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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/039,309

11/07/2001

Eiji Sato

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2127

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7590

04/06/2006

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EXAMINER

MONDT, JOHANNES P

ART UNIT

PAPER NUMBER

3663

DATE MAILED: 04/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>		<b>Applicant(s)</b>	
	10/039,309		SATO ET AL.	
	<b>Examiner</b>		<b>Art Unit</b>	
		Johannes P. Mondt	3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 17 March 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1 and 5-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) \_\_\_\_\_ is/are rejected.
- 7) ☒ Claim(s) 4 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 December 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

Amendment filed 3/17/06 after the Final Rejection mailed 11/22/05 forms the basis for this office action. The After-Final Amendment has herewith been entered. With apologies of examiner, the finality of the office action mailed 11/22/05 is herewith being withdrawn in light of a further analysis of van den Berk (4,536,059) made of record in said office action (PTO-892 mailed 11/22/05). Comments on Remarks are included below under "Response to Arguments".

### ***Drawings***

The drawings filed 12/04/2003 are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims including original claim 9. Therefore, the "pair of substrates both include (including) a concave or convex surface on one side thereof closer to the liquid crystal layer than the other side thereof" (i.e., closer than the other side of the substrate) must be shown or the feature canceled from the claim. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate

changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

The following is a quotation from the relevant sections of the Patent Rules under 37 C.F.R. 1.75 that form the basis of the objection made in this office action.

(d)

(1) The claim or claims must conform to the invention as set forth in the remainder of the specification and the terms and phrases used in the claims must find clear support or antecedent basis in the description so that the meaning of the terms in the claims may be ascertainable by reference to the description (see § 1.58(a)).

1. *The specification is objected to* because the subject matter of original claim 9, i.e., the pair of substrates both including a concave or convex surface on one side thereof that is closer to the liquid crystal layer (than the other side thereof) has not been disclosed in the remainder of the specification.

### ***Claim Objections***

2. **Claim 9** objected to because of the following informalities: the wording "closer to the liquid crystal layer" (lines 2-3) should be replaced by "closer to the liquid crystal layer than the other side of said at least one of the pair of substrates".

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. ***Claims 1, 4-6, and 8*** are rejected under 35 U.S.C. 102(b) as being anticipated by van den Berk (4,536,059).

*Van den Berk* teaches a liquid crystal display device, comprising: a liquid crystal layer between two glass supporting plates 1 and 2; see col. 4, l. 25-37)); a pair of substrates 1 and 2 (loc.cit.) so as to interpose the liquid crystal layer therebetween (see Figure 3); and a plurality of pixels arranged in matrix pattern (col. 4, l. 10-12) wherein: the liquid crystal layer has a helical structure (col. 3, l. 65) and exhibits at least two stable states including a planar state (col. 3, l. 53-58) and a focal conic state (col. 3, l. 61-65) according to an applied voltage (loc.cit.); and in each of the plurality of pixels, a thickness d of the liquid crystal layer has at least two different values (see Figure 3), and the liquid crystal layer includes at least two regions having different values for a first threshold voltage for transitioning the liquid crystal layer from the planar state to the focal conic state (because the electrodes 5 are provided in the grooves and extend over "second ridges" 4 onto "first ridges" 3, hence extend over regions of different thickness d

(see Figure 3 and col. 3, l. 1-19) while said electrodes form an equipotential surface bordering the liquid crystal layer, and consequently the electric field at two positions of different thickness is different),

Wherein the thickness  $d$  of the liquid crystal layer satisfies a relationship of  $1 < d/P < 15$  with a helical pitch  $P$  of the helical structure as evidenced by Figure 1b, showing  $d=2P$  in at least one embodiment, and wherein the thickness  $d$  of the liquid crystal layer is defined so that  $V_{thFmax}$  is less than  $V_{thHmin}$  in each of the plurality of pixels, where  $V_{thFmax}$  denotes the first threshold voltage for transitioning the liquid crystal layer included in a region with a largest thickness  $d$  of the liquid crystal layer from the planar state to the focal conic state, and  $V_{thHmin}$  denotes a threshold voltage for transitioning the liquid crystal layer included in a region with a smallest thickness  $d$  of the liquid crystal layer from the focal conic state to a homeotropic state, because "Upon applying a voltage across the transparent electrodes" as described in col. 3, l. 61-65, "planar-conic texture changes into a focal-conic texture", while ONLY when the field strength increases above a given value  $E_2$  the helices uncoil and a transparent homeotropic-nematic texture is formed" (col. 3, l. 65-68), where  $E_1 < E_2$  (see col. 4, l. 1-5).

*On claim 4:* a value of the thickness  $d$  of the liquid crystal layer increases from the center of the liquid crystal display (boss 10) to each end of the liquid crystal display device (Figure 3) and said increase in thickness is effected by a succession of a plurality of substantially flat or horizontal regions in a pixel electrode that provides a staircase pattern that rises (although not monotonically) from each of said ends to said center of the liquid crystal display device.

*On claim 5:* a difference  $\Delta d$  between the at least two different values of thickness  $d$  of the liquid crystal layer satisfies a relationship of  $0.5 P \leq \Delta d$  with the helical pitch  $P$  of the helical structure, namely: while Fig. 1b shows that  $d/P = 2$  van den Berk teaches that the thickness at the area of the edges is only half the maximum thickness (col. 5, l. 19-21), i.e.,  $\Delta d = d/2$ , resulting in the teaching  $\Delta d \geq P > 0.5 P$ , i.e.,  $0.5 P \leq \Delta d$ .

*On claim 6:* a value of the thickness  $d$  of the liquid crystal layer changes continuously across each of the plurality of pixels because a continuous line can be drawn across said pixels (see Figure 3) (see Figure 3).

*On claim 8:* at least one of the pair of substrates 1 and 2, namely: 1, includes a concave or convex surface (depending on one's center of reference being either below or above layer 1) that is closer to the liquid crystal layer than the other side.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. ***Claim 7*** is rejected under 35 U.S.C. 103(a) as being unpatentable over van den Berk as applied to claim 1, in view of Scherer (5,880,801) (first cited previously in office action mailed 4/2/704).

Van de Berk teaches a pair of alignment layers provided respectively on the pair of substrates on one side thereof closer to the liquid crystal (col. 5, l. 57-61). Van den Berk



does not necessarily disclose one of said pair to be a horizontal alignment layer and the other one to be a vertical alignment layer.

*However, it would have been obvious* to include said further limitation in view of Scherer et al, who teach top and bottom substrates 42 and 44, respectively (cf. col. 4, l. 20-60) to be aligned horizontally and vertically, respectively, so as to achieve hybrid-aligned cells by which an electro-optic response is achieved at low voltage compared with a device with pure homogeneous alignment (cf. col. 3, l. 29-47).

*Motivation* to include the teaching by Scherer into the invention by van den Berkin this regard stems from the desirability to achieve response at low voltage (Scherer, loc.cit), which is a ubiquitous advantage in the electrical art. Combination of said teaching and said invention is straightforward through the process to make HAN crystal cells as disclosed by Scherer et al (cf. col. 3, l. 7-47). Success in implementing said combination can therefore be reasonably expected.

### ***Response to Arguments***

With apologies from examiner a closer reading of van den Berk (4,536,059) requires withdrawal of the indication of allowable subject matter, in particular the indication that claims 1 and 4-9 would be allowed is herewith withdrawn. In particular, the statement that "no relation between the equivalent of  $V_{th_{Fmax}}$ , i.e.,  $E_{th}$ , and the equivalent of  $V_{th_{Hmin}}$ , i.e.,  $E_2$  as recited in claim 1 is either taught or obvious in view of any other art found to date" including van den Berk is erroneous in view of van den Berk's teaching



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that "Upon applying a voltage across the electrodes the transparent planar-conic (i.e., planar) texture (i.e., state) changes into a light-scattering focal conic texture, as shown in Figure 1c". This changes evidently takes place at a given voltage and takes place for the liquid crystal layer, while only for a higher field strength than corresponding to said focal conic state the helices uncoil into a transparent homeotropic-nematic state (col. 3, l. 61-col. 4, l. 17). Accordingly, the present rejections must regrettably be provided at this time.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Doane et al (6,104,448) (see Figures 3 and 5 with their description)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Johannes P. Mondt whose telephone number is 571-272-1919. The examiner can normally be reached on 8:00 - 18:00.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack W. Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JPM  
April 3, 2006

Patent Examiner:

  
Johannes Mondt (Art Unit: 3663).